EXPER. VIII.

I found moreover that when Light goes out of Air through ſeveral contiguous refracting Mediums as through Water and Glaſs, and thence goes out again into Air, whether the refracting ſuperficies be parallel or inclined to one another, that Light as often as by contrary refractions 'tis ſo corrected, that it emergeth in lines parallel to thoſe in which it was incident, continues ever after to be white. But if the emergent rays be inclined to the incident, the whiteneſs of the emerging Light will by degrees in paſſing on from the place of emergence, become tinged in its edges with Colours. This I tryed by refracting Light with Priſms of Glaſs within a priſmatick Veſſel of Water. Now thoſe Colours argue a diverging and ſeparation of the heterogeneous rays from one another by means of their unequal refractions, as in what follows will more fully appear. And, on the contrary, the permanent whiteneſs argues, that in like incidences of the rays there is no ſuch ſeparation of the emerging rays, and by conſequence no inequality of their whole refractions. Whence I ſeem to gether the two following Theorems.

1. The Exceſſes of the ſines of refraction of ſeveral ſorts of rays above their common ſine of incidence when the refractions are made out of divers denſer mediums immediately into one and the ſame rarer medium, are to one another in a given Proportion.

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2. The Proportion of the ſine of incidence to the ſine of refraction of one and the ſame ſort of rays out of one medium into another, is compoſed of the Proportion of the ſine of incidence to the ſine of refraction out of the firſt medium into any third medium, and of the Proportion of the ſine of incidence to the ſine of refraction out of that third medium into the ſecond medium.

By the firſt Theorem the refractions of the rays of every ſort made out of any medium into Air are known by having the refraction of the rays of any one ſort. As for inſtance, if the refractions of the rays of every ſort out of Rain-water into Air be deſired, let the common ſine of incidence out of Glaſs into Air be ſubducted from the ſines of refraction, and the Exceſſes will be 27, $27\frac{1}{8}$, $27\frac{1}{4}$, $27\frac{1}{3}$, $27\frac{1}{2}$, $27\frac{2}{3}$, $27\frac{7}{9}$, 28. Suppoſe now that the ſine of incidence of the leaſt refrangible rays be to their ſine of refraction out of Rain-water into Air as three to four, and ſay as 1 the difference of thoſe ſines is to 3 the ſine of incidence, ſo is 27 the leaſt of the Exceſſes above-mentioned to a fourth number 81; and 81 will be the common ſign of incidence out of Rain-water into Air, to which ſine if you add all the above-mentioned Exceſſes you will have the deſired ſines of the refractions 108, $108\frac{1}{8}$, $108\frac{1}{4}$, $108\frac{1}{3}$, $108\frac{1}{2}$, $108\frac{2}{3}$, $108\frac{7}{9}$, 109.

By the latter Theorem the refraction out of one medium into another is gathered as often as you have the refractions out of them both into any third medium. As if the ſine of incidence of any ray out of Glaſs into Air be to its ſine of refraction as 20 to 31, and the ſine of incidence of the ſame ray out of Air into Water, be

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